

REMARKS

In response to the Final Office Action of May 29, 2007, Applicants have amended claims 1, 9, 11, and 17, canceled claims 4 and 18, and added new claims 19 and 20. Accordingly, claims 1, 5-15, 17, and 19-20 are pending, with claims 1, 19, and 20 in independent form.

Claim 17 has been amended to correct a typographical error and to correct its dependency. No new matter has been added via this amendment.

Claims 9 and 11 have been amended to clarify the subject matter covered by these claims. No new matter has been added via these amendments.

Applicants thank the Examiner for his suggestion that, if re-written in independent form and including all of the limitations of the intervening claims, claim 10 would be allowable.

Claim 10 depends from claim 8, which in turn depends from previous claim 1. In this response, new independent claim 19 has been added which includes all of the limitations of previous claim 1, claim 8, and claim 10. Accordingly, Applicants request that new claim 19 be allowed.

New independent claim 20 has also been added in this response. Claim 20 includes the limitations from previous claim 1, claim 8, and claim 10, which Applicants believe form the basis for the Examiner's indication of allowability with regard to claim 10. New claim 20 is therefore patentable for the same reasons as claim 19, and Applicants request that new claim 20 be allowed.

Claim 18 stands rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Applicants have canceled claim 18, obviating this rejection. Accordingly, withdrawal of this rejection is respectfully requested.

In this response, claim 1 has been amended to include the limitations of previously pending claim 4. As amended, claim 1 covers radiation-emitting semiconductor components that include, in part, an n-doped confinement layer "doped both with a first n-dopant," and an active layer "doped with a second n-dopant different from the first n-dopant." The phrase "doped with" in these claim limitations is not a product-by-process limitation. Instead, the phrase "doped with" indicates that the layers have certain structural features including, for example, a concentration of dopant particles in the layers. Dopants are commonly used to alter the

conductivity properties of semiconductor layers. For example, a layer that is “doped with an n-dopant” includes a concentration of n-dopant particles which typically impart (or at least contribute toward) n-type conductivity for the layer.

Claims 1, 5, 6, 12-15, and 18 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Nakatsu (U.S. Patent No. 6,081,540, “Nakatsu”). Claims 4 and 17 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Nakatsu. In this response, claim 1 has been amended to include the limitations of previously pending claim 4. Nakatsu does not disclose or suggest the semiconductor components covered by amended claim 1, at least because Nakatsu does not disclose semiconductor components that include an “n-doped confinement layer doped with a first n-dopant,” and further include the “second n-dopant or an additional n-dopant,” as required by amended claim 1.

In connection with previously pending claim 4, the Examiner acknowledged that Nakatsu does not disclose an n-doped confinement layer that includes a first n-dopant and a second n-dopant (Office Action at page 5). However, the Examiner states that “Nakatsu teaches that a selenium and magnesium-doped active layer (14) is formed above the silicon-doped confinement layer (13)” (*id.*) and alleges that “it is implicit that some of the selenium and magnesium dopants diffuse into the n-doped confinement layer … during the chemical vapor deposition process” (*id.*).

Applicants traverse, for at least the following two reasons. First, Applicants do not agree with the Examiner’s contention that it is implicit that some of the dopants would diffuse from Nakatsu’s active layer 14 into his confinement layer 13. Applicants note that in many semiconductor structures, dopants such as Si have low mobility, and do not diffuse by any significant amount from one layer to another. Moreover, Applicants have observed that certain dopants such as Te exhibit anisotropic diffusion *away from* underlying layers. That is, certain dopants such as Te preferentially diffuse into layers that are *grown onto* a layer that includes the Te dopant, rather than into a layer onto which the Te-containing layer is grown. In other words, there is an upward migration of Te within the structure, but no downward migration. The Examiner has provided no evidence for the contention that downward diffusion of dopants in Nakatsu’s layers would be implicit, and would occur in such a manner as to read on amended

claim 1. As a result, Applicants respectfully request that the Examiner provide supporting evidence for this conjecture, or withdraw it altogether.

Second, even if, for the sake of argument only, a small number of dopant particles did diffuse from Nakatsu's active layer 14 to his confinement layer 13, the resulting confinement layer would not include an "a first n-dopant," and the "second n-dopant or an additional n-dopant," as required by amended claim 1.. The small number of foreign particles would constitute little more than a contamination of Nakatsu's confinement layer 13, not a second dopant. A person of skill in the art at the time of the invention would not understand a small number of contamination particles to constitute a second dopant. A dopant is typically introduced into a material layer to change a property of the layer, such as the layer's conductivity. Following doping, the layer's conductivity, for example, is materially altered by the presence of the dopant. This would not occur if small traces of foreign particles were present in Nakatsu's confinement layer 13 due to interlayer diffusion of dopant particles, for example.

Moreover, Applicants can find no disclosure in Nakatsu that relates to using two different dopants in a confinement layer. In contrast, Applicants' specification discloses that:

In an advantageous configuration of the invention, it is provided that the n-doped confinement layer is doped both with the first n-dopant and with an additional dopant ... This achieves the result of increasing the active doping to the sum of two active dopant concentrations. The advantage of high achievable doping and a sharp doping profile is simultaneously preserved. (Specification, page 2, par. 7.)

In other words, the recitation in claim 1 that the semiconductor component includes an n-doped confinement layer "doped with a first n-dopant," and including the "second n-dopant or an additional n-dopant" implies that the confinement layer includes concentrations of both the first n-dopant, and the second or additional n-dopant, that are sufficient to materially affect the conductivity of the layer. This does not occur, for example, if dopants are present only in trace amounts.

Furthermore, Applicants have recognized that by using two different dopants in a confinement layer, the active doping level of the confinement layer can be increased to the sum

of the two individual dopant concentrations, and at the same time, sharp doping profiles can be preserved in the confinement layer. There is simply no disclosure in Nakatsu that relates to the use of multiple dopants in a confinement layer, and there is no recognition that it would be possible to derive advantages therefrom.

Applicants therefore submit that Nakatsu does not disclose or suggest the semiconductor components covered by amended claim 1. Moreover, allowing for a reasonable interpretation of the term “dopant” as would be understood by a person of skill in the art at the time of the invention, Nakatsu’s devices do not inherently include all of the features of the semiconductor components covered by amended claim 1. Accordingly, claim 1 is patentable over Nakatsu, and Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 102(b).

Claims 5, 6, 12-15, and 17 depend from claim 1, and are therefore patentable for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejection of these claims is also respectfully requested.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nakatsu in view of Ishikawa et al. (U.S. Patent No. 5,696,389, “Ishikawa”). Without conceding the merits of the Examiner’s proposed combination of Nakatsu and Ishikawa, Applicants note that claim 7 depends from claim 1, which is patentable over Nakatsu as discussed above. Ishikawa does not cure Nakatsu’s deficiencies, at least insofar as Nakatsu does not disclose or suggest semiconductor components that include an n-doped confinement layer “doped with a first n-dopant” and further including the “second n-dopant or an additional n-dopant,” as required by amended claim 1. Accordingly, claim 7 is patentable over Nakatsu and Ishikawa alone or in combination, and withdrawal of the rejection of claim 7 is respectfully requested.

Claims 8, 9, and 11 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nakatsu in view of Anayama (U.S. Patent Publication No. 2002/0027935 “Anayama”). Without conceding the merits of the Examiner’s proposed combination of Nakatsu and Anayama, Applicants note that claims 8, 9, and 11 depend from claim 1, which is patentable over Nakatsu as discussed above. Anayama does not cure Nakatsu’s deficiencies, at least insofar as Anayama does not disclose or suggest semiconductor components that include an n-doped confinement layer “doped with a first n-dopant” and further including the “second n-dopant or an

additional n-dopant," as required by amended claim 1. Accordingly, claims 8, 9, and 11 are patentable over Nakatsu and Anayama alone or in combination, and withdrawal of the rejection of claims 8, 9, and 11 is respectfully requested.

In view of the foregoing, Applicants ask that the application be allowed.

Canceled claims, if any, have been canceled without prejudice or disclaimer. Any circumstance in which Applicants have: (a) addressed certain comments of the Examiner does not mean that Applicants concede other comments of the Examiner; (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or (c) amended or canceled a claim does not mean that Applicants concede any of the Examiner's positions with respect to that claim or other claims.

The fees for the Petition for Extension of Time are being paid concurrently on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply any other required fees to Deposit Account No. 06-1050, referencing 12406-141US1.

Respectfully submitted,

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